

Claims

We claim

5 1. A computer-implemented method for previewing two or more motion control operations, the method comprising:

 receiving user input selecting the two or more motion control operations, wherein the motion control operations are operable to perform motion control of a hardware device;

10 storing information representing the two or more motion control operations;

 displaying a first preview window for previewing the motion control performed by the two or more motion control operations; and

 displaying information in the first preview window which visually indicates the motion control performed by the two or more motion control operations.

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 2. The method of claim 1, further comprising:

 receiving user input to the first preview window to visually change the motion control performed by the two or more motion control operations; and

 changing one or more of the motion control operations in order to update the motion control performed by the motion control operations in accordance with the user input;

 wherein said changing one or more of the motion control operations comprises changing the stored information.

25 3. The method of claim 1,

 wherein the first preview window comprises a window for previewing a velocity profile for the two or more motion control operations;

 wherein the method further comprises displaying velocity information in the first preview window for at least a portion of the motion control performed by the two or more

30 motion control operations.

4. The method of claim 1,
wherein the first preview window comprises a window for previewing an
acceleration profile for the two or more motion control operations;

5 wherein the method further comprises displaying acceleration information in the
first preview window for at least a portion of the motion control performed by the two or
more motion control operations.

5. The method of claim 1,
wherein the first preview window comprises a window for previewing position
10 data for the two or more motion control operations in a two-dimensional view;

wherein the method further comprises plotting two-dimensional position data in
the first preview window to visually indicate at least a portion of the motion control
performed by the two or more motion control operations.

15 6. The method of claim 1,
wherein the first preview window comprises a window for previewing position
data for the two or more motion control operations in a three-dimensional view;

20 wherein the method further comprises plotting three-dimensional position data in
the first preview window to visually indicate at least a portion of the motion control
performed by the two or more motion control operations.

7. The method of claim 1, further comprising:
dynamically updating the first preview window in response to selecting each of
the two or more motion control operations to visually indicate the effect of selecting each
25 operation.

8. The method of claim 1, further comprising:
receiving user input to configure one or more capture operations to be performed
in one or more of the motion control operations;

30 wherein said displaying information in the first preview window which visually
indicates the motion control performed by the two or more motion control operations

comprises displaying information in the first preview window which visually indicates the one or more capture operations.

9. The method of claim 1, further comprising:

5 receiving user input to configure one or more breakpoint operations to be performed in one or more of the motion control operations;

wherein said displaying information in the first preview window which visually indicates the motion control performed by the two or more motion control operations comprises displaying information in the first preview window which visually indicates
10 the one or more breakpoint operations.

10. The method of claim 1,

wherein said displaying information in the first preview window comprises displaying information which visually indicates only a portion of the motion control
15 performed by the two or more motion control operations.

11. The method of claim 1,

wherein said displaying information in the first preview window which visually indicates the motion control performed by the two or more motion control operations
20 comprises interactively tracing a trajectory performed by the two or more motion control operations.

12. The method of claim 11, further comprising:

receiving user input specifying rate information regarding a desired rate at which
25 to trace the trajectory; and

interactively tracing the trajectory performed by the two or more motion control operations at a rate in accordance with the specified rate information.

13. The method of claim 1, further comprising:

30 receiving user input specifying scale information regarding a desired scale at which to display the information in the first preview window; and

displaying the information in the first preview window at a scale in accordance with the specified scale information.

14. The method of claim 1,

5 wherein said displaying information in the first preview window comprises displaying first information which visually indicates a first view of the motion control performed by the two or more motion control operations;

wherein the method further comprises:

10 displaying a second preview window for previewing the motion control performed by the two or more motion control operations; and

displaying second information in the second preview window which visually indicates a second view of the motion control performed by the two or more motion control operations.

15 15. The method of claim 14,

wherein said displaying the first information visually indicating the first view of the motion control performed by the two or more motion control operations comprises displaying two-dimensional position information indicating the motion control;

20 wherein said displaying the second information visually indicating the second view of the motion control performed by the two or more motion control operations comprises displaying three-dimensional position information indicating the motion control.

16. The method of claim 14,

25 wherein said displaying the first information visually indicating the first view of the motion control performed by the two or more motion control operations comprises displaying two-dimensional position information indicating the motion control;

30 wherein said displaying the second information visually indicating the second view of the motion control performed by the two or more motion control operations comprises displaying velocity information indicating the motion control.

17. The method of claim 1,

wherein said receiving user input selecting the two or more motion control operations does not include receiving user input specifying programming language code to implement the two or more motion control operations.

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18. The method of claim 1, further comprising:

displaying a graphical user interface (GUI) that provides GUI access to a set of motion control operations;

wherein said receiving user input selecting the two or more motion control operations comprises receiving user input to the graphical user interface selecting the two or more motion control operations.

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19. The method of claim 18, further comprising:

receiving user input to the graphical user interface for configuring one or more of the selected operations;

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wherein, for each operation, said configuring the operation affects motion control which the operation is operable to perform.

20. The method of claim 19,

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wherein said receiving user input to the graphical user interface for configuring one or more of the selected operations does not include receiving user input specifying programming language code to configure the operations.

21. The method of claim 19, further comprising:

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for each operation to be configured, displaying a graphical panel including graphical user interface elements for setting properties of the operation and receiving user input to the graphical panel to set one or more properties of the operation.

22. The method of claim 1,

wherein said storing information representing the two or more motion control operations comprises storing a motion control sequence comprising the two or more motion control operations.

5 23. The method of claim 1,
 wherein said storing information regarding the two or more motion control operations comprises storing a prototype comprising the two or more motion control operations.

10 24. The method of claim 1,
 wherein said storing information regarding the two or more motion control operations comprises creating program instructions for implementing the two or more motion control operations.

15 25. The method of claim 24,
 wherein said creating program instructions for implementing the two or more motion control operations comprises programmatically generating at least a portion of a graphical program;
 wherein the graphical program includes a plurality of interconnected nodes that
20 visually indicate functionality of the graphical program.

 26. The method of claim 25,
 wherein said programmatically generating the at least a portion of the graphical program comprises including one or more nodes in the graphical program operable to
25 implement the two or more motion control operations.

 27. The method of claim 25, further comprising:
 executing the graphical program to perform the two or more motion control operations.

30 28. The method of claim 25,

wherein the graphical program is a graphical data flow program.

29. The method of claim 24,

wherein said creating program instructions for implementing the two or more
5 motion control operations comprises generating at least a portion of a text-based
program;

wherein said generating the at least a portion of the text-based program includes
generating a plurality of function calls operable to implement the two or more motion
control operations.

10 30. The method of claim 24, further comprising:

displaying the created program instructions in a second window.

31. The method of claim 30, further comprising:

15 receiving user input to the first preview window to visually change the motion
control performed by the two or more motion control operations;

changing the program instructions to implement the new motion control
performed by the two or more motion control operations; and

updating the second window to display the changed program instructions.

20 32. A computer-implemented method for previewing a sequence of motion
control operations, the method comprising:

25 creating the sequence of motion control operations, wherein the sequence of
motion control operations comprises one or more operations operable to perform motion
control of a hardware device;

displaying a first preview window for previewing the motion control performed
by the sequence of motion control operations; and

30 displaying information in the first preview window which visually indicates the
motion control performed by the sequence of motion control operations.

33. The method of claim 32, further comprising:

receiving user input to the first preview window to visually change the motion control performed by the sequence of motion control operations;

5 changing one or more operations in the sequence in order to update the motion control performed by the sequence in accordance with the user input.

34. The method of claim 32,

10 wherein said creating the sequence of motion control operations comprises receiving user input requesting to add each operation to the sequence;

wherein the method further comprises dynamically updating the first preview window in response to each operation added to the sequence to visually indicate the effect of adding the operation.

15 35. The method of claim 32,

wherein said displaying information in the first preview window which visually indicates the motion control performed by the sequence of motion control operations comprises interactively tracing a trajectory performed by the sequence of motion control operations.

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36. The method of claim 32,

wherein said displaying information in the first preview window comprises displaying first information which visually indicates a first view of the motion control performed by the sequence of motion control operations;

25 wherein the method further comprises:

displaying a second preview window for previewing the motion control performed by the sequence of motion control operations; and

30 displaying second information in the second preview window which visually indicates a second view of the motion control performed by the sequence of motion control operations.

37. The method of claim 36,

wherein said displaying the first information visually indicating the first view of the motion control performed by the sequence of motion control operations comprises displaying two-dimensional position information indicating the motion control;

5 wherein said displaying the second information visually indicating the second view of the motion control performed by the sequence of motion control operations comprises displaying three-dimensional position information indicating the motion control.

10 38. The method of claim 36,

wherein said displaying the first information visually indicating the first view of the motion control performed by the sequence of motion control operations comprises displaying two-dimensional position information indicating the motion control;

15 wherein said displaying the second information visually indicating the second view of the motion control performed by the sequence of motion control operations comprises displaying velocity information indicating the motion control.

39. The method of claim 32,

20 wherein said creating the sequence of motion control operations does not include receiving user input specifying programming language code to implement the sequence of motion control operations.

40. The method of claim 32, further comprising:

25 displaying a graphical user interface (GUI) that provides GUI access to a set of motion control operations;

wherein said creating the sequence of motion control operations comprises receiving user input to the graphical user interface specifying operations to include in the sequence of motion control operations.

30 41. The method of claim 40, further comprising:

receiving user input to the graphical user interface for configuring one or more of the operations in the sequence;

wherein, for each operation, said configuring the operation affects motion control which the operation is operable to perform;

5 wherein said receiving user input to the graphical user interface for configuring one or more of the operations in the sequence does not include receiving user input specifying programming language code to configure the operations.

42. The method of claim 41, further comprising:

10 for each operation to be configured, displaying a graphical panel including graphical user interface elements for setting properties of the operation and receiving user input to the graphical panel to set one or more properties of the operation.

43. A memory medium for previewing two or more motion control operations,
15 the memory medium comprising program instructions executable to:

receive user input selecting the two or more motion control operations, wherein the motion control operations are operable to perform motion control of a hardware device;

store information representing the two or more motion control operations;

20 display a first preview window for previewing the motion control performed by the two or more motion control operations; and

display information in the first preview window which visually indicates the motion control performed by the two or more motion control operations.

25 44. The memory medium of claim 43, further comprising program instructions executable to:

receive user input to the first preview window to visually change the motion control performed by the two or more motion control operations; and

30 change one or more of the motion control operations in order to update the motion control performed by the motion control operations in accordance with the user input;

wherein said changing one or more of the motion control operations comprises changing the stored information.

45. A system for previewing two or more motion control operations, the system comprising:

- a processor;
- a memory storing program instructions;
- a display device;
- a motion control device;

wherein the processor is operable to execute the program instructions stored in the memory to:

receive user input selecting the two or more motion control operations, wherein the motion control operations are operable to control the motion control device;

store information representing the two or more motion control operations;

display a first preview window on the display device for previewing motion control performed by the two or more motion control operations; and

display information in the first preview window which visually indicates the motion control performed by the two or more motion control operations.

46. A system for previewing two or more motion control operations, the system comprising:

a motion control device;

means for receiving user input selecting the two or more motion control operations, wherein the motion control operations are operable to control the motion control device;

means for storing information representing the two or more motion control operations;

means for displaying a first preview window for previewing motion control performed by the two or more motion control operations; and

displaying information in the first preview window which visually indicates the motion control performed by the two or more motion control operations.